COMMERCIAL BANK PERFORMANCE IN DIGITAL ERA: EVIDENCE FROM MALAYSIA

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ABSTRACT

Bank as a financial institution play a wider role in Malaysia. In order to ensure connectivity, the banking sector explore into technology as market demand increase. Early of year 2000, the bank started to develop new banking instruments with new technology innovation and connectivity. The aim of the study is to investigate the bank internal factors relationship on Malaysian commercial banking sector performance. Other than that, it is to analyse the connection of macroeconomic factors towards Malaysian commercial banking performance and to examine the relationship of technology on Malaysian commercial banking performance. Through secondary data collection method, 8 Malaysia local bank been used as sample for this study. This study employed multiple regression analysis to identify the determinates of bank performance. The result shows that bank internal factor had significant correlation towards Malaysia bank performance. It indicates that bank size, credit risk and capital adequacy play significate role in banks. Moreover, the finding also shows that there is significate relationship between technology and bank performance. This signs that bank certainly affected by technology innovation which indicates bank has to make clearer strategic plan to sustain in this sector and improve their performance. On the other hand, there were no significate found among macroeconomic towards bank performance.

Keywords: ROE, Technology, Innovation, Regression Analysis, Malaysia

ABSTRAK

Bank sebagai institusi kewangan memainkan peranan yang lebih luas di Malaysia. Untuk memastikan kesambungan, sektor perbankan meneroka teknologi apabila permintaan pasaran meningkat. Pada awal tahun 2000, bank mula membangunkan instrumen perbankan baru dengan inovasi teknologi dan kesalinghubungan baru. Tujuan kajian ini adalah untuk menyiasat hubungan faktor dalaman bank terhadap prestasi sektor perbankan komersial Malaysia. Selain itu, untuk menganalisis hubungan faktor makroekonomi ke arah prestasi perbankan komersial Malaysia dan untuk mengkaji hubungan teknologi di Malaysia prestasi perbankan komersial. Melalui kaedah pengumpulan data sekunder, 8 bank tempatan Malaysia telah digunakan sebagai sampel untuk kajian ini. Kajian ini menggunakan analisis regresi berganda untuk mengenal pasti penentu prestasi bank. Hasilnya menunjukkan bahawa faktor dalaman bank mempunyai korelasi yang signifikan terhadap prestasi bank Malaysia. Ia menunjukkan bahawa saiz bank, risiko kredit dan perolehan tanda kecukupan modal dalam bank. Lebih-lebih lagi, penemuan ini juga menunjukkan bahawa ada hubungan isyarat antara teknologi dan prestasi bank. Ini menunjukkan bahawa bank pasti terjejas oleh inovasi teknologi yang menunjukkan bank perlu membuat rancangan strategik yang lebih jelas untuk mengekalkan sektor ini dan meningkatkan prestasi mereka. Sebaliknya, tiada tanda yang terdapat di kalangan makroekonomi terhadap prestasi bank.

Kata kunci: ROE, Teknologi, Inovasi, Analisis Regresi, Malaysia

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TABLE OF CONTENTS

LIST OF TABLE

LIST OF FIGURES

CHAPTER 1

BACKGROUND OF THE STUDY

1.0 INTRODUCTION

The banking sector is an intermediation channels from surplus unit and allocate it as credit to deficit unit in an economy. The banking sector provides important function by converting deposits into productive investment. The crisis that started in 2008 underlines the importance of bank to the economy.

The disaster in 2008 continues to reshape of the banking industry. It rises fundament question about how larger and complex business banks operate. Greater scale and scope and wide diversification and across products were expected to reduce risk and insulate larger from macroeconomics and financial market shock.

Developing economics in East and South Asia have seen their banking sectors go through important transformation. Throughout the last decade pressures brought on 2008 financial crisis and by the global trend towards increasing financial integration have resulted in significant reform and structural change. Countries in East and South Asia have embarked in effort to clean up their banking system in moving towards digitalization.

In Malaysia, commercial banks plays important role in banking sector, they are the largest fund provider as mentioned by Sufian, Kamarudin, & Nassir, (2016). Traditionally, commercial banks accept deposit from depositors, giving loans or financing, custody facility and bank guarantees, which included in retail banking services. As time develop the commercial bank service become wider, which includes bank acceptance, involve in foreign exchange market, treasury facility and remittance services (Sufian *et al*., 2016). In this manner, it permits a constant money circulation in

the economy through investing and loaning money. Appendix 1 provides list of commercial banks in Malaysia.

In order to ensure connectivity, the banking sector explore into technology as market demand increase which is to Local Area Network (LAN). LAN is a starting point of technology into banking. This system ensures connectivity with other bank branch through system that banking data can be centralized and manageable. Early of year 2000, the bank started to develop new banking instruments with new technology innovation and connectivity. They came out with a facility where, the bank account can be access from anywhere. It is also called internet banking, as well there were some new feature add on from time to time. At some point, the fund transfer can be done through online with instant option.

Globalization brings in new advancement of innovation in banking sector (Robin, Salim, & Bloch, 2018). Currently Malaysia banking market are moving towards digital. It creates new prospect through core banking service throughout worldwide which only can be done by invention of banking technology.

According to Sufian *et al.*, (2016) Malaysia as developing countries, where banking segment controls greater part of financial flows and accounts over 70% financial system resources. Malaysia's commercial banks are one of the key players as financial intermediation in the economy and country are highly depended commercial bank performance. Consistent with Merton, (1992) discussed the key role of bank in the financial system who controls economic resources over time even during unstable situation.

As well, as Malaysia continue their good progress towards develop nation, the technology factor should be considered as an option to stay competitive in banking

sector. Although the technology mitigates new risk into system, it encourages innovation and creative thinking to ensure cost efficiency in services supplied.

In this study the term banking technology composed by computer science together with information and communication advancement to empower bank towards better service for their customer. Banking is one of the divisions that technology innovation is advance at the same time need to be monitored closely. In financial institution innovation and development is something possible but hard to develop. Previously, ATM and telephone banking were one of the advancements that have been contributed to the customer and banks. However, it already been replaced with better technology which is internet banking and mobile banking. Thus, even though technology in banking sector has develop, but there are still higher possibilities for humans to come out with a better innovation in future.

Bank customer feels that banking technology makes the work more convenience together it saves transaction time compared to the traditional way of banking. Moreover, customer mostly attract with its nice-looking features and application and improve tendency of new customer into business.

Utilization of banking technology in banking sector ensure banking product with lower cost with 24 hours of operation for whole year. Thus, the dependence to branches banking is decrease. These points highlight urge banks to take technology-based instrument for client which are increasing day by day. The increase in demand for this type of services contributes great deal to this banking field.

In contrast, technology doesn't speak good thing every time. The most import part of technology is security risk which associated with possibility of losing personal data and money due system hack or unauthorized entry. This address the bankers not to be a

software expert but need understand the landscape of technology well to manage the challenges.

1.2 PROBLEM STATEMENT

Time has change bank had driven far through technology, yet still exploring new instrument and method in delivering products and services to their customer. Technology in banking sector offer chances to have favourable cost circumstance, expanding productivity and encourage to low down the operational risk compared to the traditional banking. Moreover, studies done by Chai, Tan, & Goh, (2016) shows there are sufficient customer demand for technology-based banking product and perform as good short-term investment for banks. Experimental investigation by Tunay, Tunay, & Akhisar, (2015) made on different countries, uncover that electronic banking service enhance the performance of bank. But this result doesn't reflect in some less developed countries because low infrastructure investment and customer are still preferred traditional way of banking on their country.

On the another part, as Akhisar, Tunay, & Tunay, (2015) revealed that bank development in technology influence bank performance. The effect of technology banking service shows the innovation or digitalization brings positive performance into bank. Measurement of ROA and ROE as indicator of banking performance significantly positive. Clearly, proves that technology plays important role in boosting and strengthen up the banking performance. In other word technology made the banking sector endure or sustain in current competitive market.

Conversely, for Asian countries Sadr & Mohammad, (2013), and for Romania Gutu, (2014) findings show that the impact on the profitability of some electronic banking is

negative. At the same time, Gutu, (2014) determined that banks position did not changed inspite of depositing on higher advertising budget for internet banking.

Although, most of young generation prefer internet banking but older generation prefers tradition method of banking. At the same time, most of bank client are range of older generation which refuse force the banking sector place more branches to provide service which consume more cost and affect the bank performance in some areas.

In Malaysia, almost 70% part of financial system flows controls by banking sector Sufian *et al.*, (2016). It makes sense that the banking performance changes might affect the overall economy of Malaysia. Sometime, absorption of technology into banking sector doesn't reflect bank performance like ROE and ROA which moves unparallelly according to (Siddik, Sun, Kabiraj, Shanmugan, & Yanjuan, 2016)

Technology brings in much strict condition into banking sector which they must grapple and lower down the margin. At the same time bank had to cut down some bonuses to the employee and dividend, to cover swelling cost for the reason of technology which affect the banking performance. This forms difference growth on ROE compared ROA as studies done by (Abaenewe, Ogbulu, & Ndugbu, 2013).

These have made the open doors for development and difficulties for banks to stay beneficial in current progressive condition. This argument brings gap between technology and bank performance. Therefore, this raises research question regarding the potential of technology in banking sector that contribute significate changes in Malaysia banking performance.

1.3 RESEARCH OBJECTIVE

1. To investigate the bank internal factors relationship on Malaysian commercial banking sector performance.
2. To analyse the connection of macroeconomic factors towards Malaysian commercial banking performance.
3. To examine the relationship of technology factors on Malaysian commercial banking performance.

1.4 RESEARCH QUESTION

This paper observe factor that affecting banking performance specifically on the question below:

1. Which internal factor, influence the performance of the Malaysian commercial bank?
2. Which macroeconomic factor that give impact to the performance Malaysian commercial bank?
3. Does technology give an impact to the Malaysian commercial bank performance?

1.5 SIGNIFICANT OF STUDY

This study investigates the effect of technology on bank performance to ensure Malaysia banking sector are on the right track on technology adaption into the banking operations and products. At the same time, it gives banking industry a sustainable plan to gain profits and improve their banks performance. On top of that, the banks can bring

in new ideas on the banking technology instruments. As well, it helps banks to facilitate and expand their financial service to unexplored area.

On the previous discussion, Malaysia banking sector controls about 70% of financial system flow, bring more responsibilities to the government as policy maker. In order to regulate the economy and financial stability, the government need to play and important role in ensure to protect the customers rights in order to avoid exploitation towards user. In future this study, creates new resources for academical purpose and believes to create more opportunity of collaboration with banking industry in implementation of sustainable outcome.

1.6 SCOPE OF STUDY

The research emphasis on the commercial banks in Malaysia. This study has narrow down to 8 banks due to it is currently operating local commercial banks in Malaysia. Secondly the period of study will be from year 2005- 2017 which is 12 years. Due to the availability of technology data in Malaysia the study is conducted from 2005. This study used panel data which emphasise 84 observation.

1.7 CONCLUDING REMARK

This chapter discussed background of the study which emphasis the change of banking sector overall and development of technology in Malaysia banking sector. Next, includes issues through problem statement for this study, which directed to development of research objective and questions for this study. There are three research objective and research questions are listed down in this study. Following with significate of study and scope of study discuss total number of samples and type of data

been used and relevance of this study. Finally, organization of the study, listed division for this paper.

1.8 ORGANIZATION OF THE STUDY

This study is divided into 5 chapters where Chapter 1 comprise introduction, problem statement, research question, significate of study and scope of study. Meanwhile, Chapter 2 discusses literature review which includes two parts, namely theoretical and empirical study. Next, Chapter 3 involves the data description, research framework, hypothesis development and method of analysis which emphasis on the model that been used in the study. Additionally, Chapter 4 includes result and the discussion of the findings. Lastly, Chapter 5 provides conclusion of study contribution and limitation of the study.

CHAPTER 2

LITERATURE REVIEW

2.0 THEORY

2.0.1 Innovation Diffusion Theory

Innovation Diffusion Theory by Rogers, (1962) is the theory that discusses uncertainty reduction behaviour among the potential adapters during the first technological innovation. Whereby, it discusses new technology influential level and the adoption process. In the technology introduction phase, the adopter or innovator faces obstacles day by day. Based on Shih & Fang, (2004) the adopter will be the banking sector which adopting new technologies and providing the instruments to their customer. In order to tackle the problems, the adopters will be updated with extra information in order to mitigate the technology risk related on the innovation from the social system. This process will lead to innovation and new technology to appear.

The Innovation Diffusion Theory is of connected to the investigation in discovering the effect of technology selection on the commercial bank's performance. The theory expresses that appropriation of information and communication technology shows a solid hypothetical help towards banking instruments innovation. As indicated by the theory, financial performance seems to have a solid connection to technology reception. It is this viewpoint that the investigation sets to discover. The theory is useful in directing the basic parts of adoption of ICT into organizations. This is especially to the present investigation to discover the effect of technology reception on financial performance of the commercial banks. Innovation diffusion theory comprises of innovation, adopters, communication channels social system and time. This segment is

useful in understanding the associations of technology on the commercial banking performance as an objective in this study.

2.0.2 Technology Acceptance Model (TAM)

Technology Acceptance Model is a set of information system which comprise collection of data set that used to understand the user's decision on the technology. In financial institution the idea or intention of using will be based on the believes that it will increase their working performance. As well Davis, (1989) believes usefulness of technology is an important factor in determining the model, whether it improves the job performance or else the technology makes free from effort or reduce working force.

In this study TAM is significate to the examination as it is gone for clarifying what makes potential adopters like or dislike the utilization of technology. The theory guides us in understanding what impacts the utilization of different technology segments by the banking business. Banks utilize all or a portion of the accompanying technology segments like internet banking, mobile banking and ATM machine. The theory influences the research gap to understand why banks may receive the different ICT segments which may impact their performance. According to Davis, (1989) most of the community tend to utilize innovation with the goal to improve the performance of work. The theory hence directs this study to discover the impact on the utilization of technology into Malaysia commercial banking performance.

2.1 PAST STUDIES

2.1.1 Bank Performance

Most of study had focused on the key profitability indicator like profitability, net interest margin (NIM), return on assets (ROA) and return on equity (ROE) (Robin et al., 2018). Basically, ROA indicates how the financial institution create wealth through management of asset or resources. Different with ROE which indicate how much wealth created through shareholders equity Akhisar, Tunay, & Tunay, (2015). According to Robin *et al.*, (2018), they finds that changes in NIM total asset are relay on quality of an asset.

In the meantime, based on most of the study Return on asset (ROA) and Return on equity (ROE) are been used as indicator to measure profitability for banks, for example Robin *et al.*, (2018); Akhisar *et al.*, (2015) and Hailegebreal, (2016). But at same time they found that ROA is better than ROE which been highlighted by Robin, Salim, & Bloch, (2018). They have stated that higher ROE does not reflect higher banking performance but may due lack of number of equity or capital. ROA exhibits the proceeds earned per unit of asset and shows the bank management capacity to utilize the bank's resources to create income, consequently it may be seen as the best bank performance indicator (Sufian et al., 2016).

Conversely, ROE only shows how equity fund been utilized to create revenue but never take into account liabilities and other commitments. But study done (Siddik et al., 2016) using two indicator ROA and ROE, they only found positive significate between ROE. It is clear that, ROA are not always the best indicator for performance measurements.

In short, cross country studies bring in mix results on bank performance indicator. Some researches like Alexiou & Vogiazas, (2009) believes that ROA can be biased at some

point as it doesn't take into account off balance sheet activities. In this study, ROE will be the best choice as indicator for bank performance accordance with Siddik *et al.*, (2016) which finds ROE makes significant contribution in Bangladesh banking sector.

2.1.2 Technology and Bank Performance

Nowadays the adaption of technology in to banking product and operation are rising gradually. Started from telephone banking and developed to internet banking and currently mobile banking, it is undoubted that technology in banking makes the work more convenient and easier. At present, bank services can be utilised 24 hours through electronic and internet banking (Tunay et al., 2015).

At same time, Akhisar *et al.*, (2015) discovered that bank development in technology influence bank performance. The impact of new era banking or technology suggests the innovation or digitalization brings tremendous performance into banking institution. Along with this Chai, Tan, & Goh, (2016) proved that bank performance can be stepped forward further through advance the technology level in banks.

Furthermore, DeYoung, Lang, & Nolle, (2007) studies found that technology adoption boosted bank profitability mainly thru elevated revenues from deposit service fees. The findings recommended that technology adoption was related to an economically and statistically vast development in bank profitability. As well, in European and United State advanced in technology boost the overall profitability for banking sector (Tunay *et al.*, 2015).

Moving into Malaysia as a developing country, some studies based on survey suggest that technological innovation is a matter on Malaysia banking sector (Chai *et al.*, 2016). As well, Malaysia had become a country with well organised banking infrastructures

and development. The banks had to replicate technology development into their product and services according to the customer needs. This positive impact might from cost efficiency from technology adaption into banking sector. In term of support study done by Akhisar *et al.*, (2015) discussed that the transaction cost would became cheaper by 40% to 80% through internet banking compared in traditional way.

On the other hand, empirical study done by Sathye, (2005) and Sullivan, (2000) shows that banking technology didn't display huge affiliation with the bank's performance. Besides, on recent studies in Romania by Gutu, (2014) and for Asian countries by Hossein, (2013) finds that technology brings negative impact towards its bank profitability. As there was some technology infrastructure barrier which gives poor results towards the bank performance.

As in developing countries shows there are shows lack of relation between technology and bank performance based on Nigeria country (Ugwueze & Nwezeaku, 2016). This provides gap or contradict effect on the bank financial performance outcomes from technology. Thus there are some author argument like Gutu, (2014) which suggested that does not gives a clear and positive outcomes on the banks performance. But in the same study suggested that technology adaption into developing countries banking system reduces the operational cost which might affect the banks performance.

In summary, technology blocks impact are thought in to banking sector profitability and effectiveness (Chai *et al.*, 2016); Akhisar *et al.*, (2015). In general, the technology in banking sectors are reliable on this competitive business activity. At the same time, according to Weigelt & Sarkar, (2012) the bank encouraged or required to be on the track with technology advancement in order to fulfil their customer needs and boost

their profitability. In line with, it is relevant to study technology on Malaysia commercial banking performance.

2.1.3 Macroeconomic and Bank Performance

According to Gutu, (2014) study on technology should include more bank and macroeconomic variables to explain better technological revolution. Based on most of studies refer Sufian & Habibullah, (2009) finds that macroeconomic factor determines reflect their bank performance.

2.1.3.1 Gross Domestic Product

GDP is a measurement of market value in the scope of final goods and services that been produce in the economical time. On the macroeconomic level, GDP used to evaluate total economic activities by (Robin *et al.*, 2018).

The empirical finding in Euro by Petria, Capraru, & Ihnatov, (2015) over 2004 until 2011 maintained that GDP bring in positive effect on bank performance.. At the same time study by Hailegebreal, (2016) brings that GDP has clearly positive relation with financial performance of the financial institution. Plus, in China by Xiaoxi & Daly, (2014) they found positive relationship among GDP with banking performance.

In contrast, study done by Alper & Anbar, (2011) in Turkey finds that bank performance cannot be influence by GDP. Based on Sufian, Kamarudin, & Nassir, (2016) who finds that GDP does not really reflect the bank performance where, they finds Malaysia had a competitive banking sector which strengthen and sustain the banking performance.

In addition, economical factor like GDP affecting significantly on the bank financial performance in Nigeria Oluwaseyi Ebenezer, Ahmad Wan Bin Omar, & Kamil, (2017). Unlike previous study research done by Combey & Togbenou, (2017) in Togo where they finds no relation among macroeconomic factor towards banking performance in short term. But in long term it shows vice versa where GDP, shows negative significant on the bank financial profitability.

In summary, according to Robin et al., (2018) GDP indicator also reflects the capacity of a borrower in bank loan or debt servicing. Consequently, higher economic growth may encourage loan repayment and reduce the credit risk, while economic growth towards low it may lower the strength of debt servicing where increase in non-performing loan affect the banking performance negatively. Thus, uses GDP as a variable on commercial banking performance is relevant.

2.1.4 Bank Specific Factor and Bank Performance

Overall of study had used bank specified factor as a constant variables Robin *et al.*, (2018) Edirisuriya, Gunasekarage, & Dempsey, (2015) Sufian & Habibullah, (2009). In line with this study which maintained bank specific aspect as constant variables. Based on Oluwaseyi Ebenezer, Ahmad Wan Bin Omar, & Kamil, (2017) and Alper & Anbar, (2011) investigate bank specific variables on bank performance, this study finds bank specific variables has significant relationship on bank performance.

2.1.4.1 Bank Size

Theoretically, larger banks can work more efficient by providing product and services with lower cost and improve the bank profitability (Muda, Shaharuddin, & Embaya,

2013). The research demonstrated bank size as total asset as Robin, Salim, & Bloch, (2018). Along with their study in Malaysia had discussed how banks size reflect on bank profitability.

There is also study done in Australia with sample of 21 banks from year 2000 to 2012. The studies finds that banks specified factor like banks size and loan to total asset or some refer it as asset quality had influence the bank profitability (Edirisuriya *et al.*, 2015). Even (Abdullah, Parvez, & Ayreen, 2014) had investigate on Bangladesh banking sector, they find that bank size influences the banking performance in positive way.

According Sufian & Habibullah, (2012) finds negative relationship towards bank performance in China. Plus, some bigger financial institution will face diseconomy or economic disadvantage like rise in operational cost indirectly which affect the return or the banking performance. At the same time study done in Vietnam by (Nguyen & Nguyen, 2018) finds bank size negatively significate on bank performance.

In a nutshell, cross country studies bring in different result on bank size towards bank performance. Thus, it will be interesting to find out the result on bank size in Malaysia as, currently technology aspect might bring different result.

2.1.4.2 Credit Risk

According to (Abdullah *et al.*, 2014) credit risk factor shows effect negatively towards the banking performance in Bangladesh. In credit risk it is calculated as (Loan loss provision/ Total loan) based on (Edirisuriya *et al.*, 2015). This is to find out the customer who obtain loan for certain institution and unable to repay them back as agreed. Consistent with Miller & Noulas, (1997) non-performing loans may decreases

the bank profitability if been overlooked which led to credit risk. Furthermore, Abdullah *et al.*, (2014) studies show that credit risk led to partially loss or affect the bank's profitability.

In some case, like Abiola & Olausi, (2014) shows that credit risk bring positive impact on bank performance because believed that the despite of high level of non-performing loan the bank earn interest from it which been transfer as profit earning.

Besides that, (Sufian & Habibullah, 2012) studies find that credit risk never significate towards bank performance in China.

Since, according Sufian *et al.*, (2016) bank is major role in Malaysia financial system as loan provider, it reflect that the bank operates on high credit risk environment. Thus, it is important to study the effect of credit risk towards bank performance.

2.1.4.3 Capital adequacy

The capital ratio is an indicator of solvency for financial institution. In financial institution, higher capital ratio will reduce depended on external funding therefore raises the performance (Robin *et al*., 2018). Based on Jones, (2000) implementation of Basel capital framework changes bank's capital structure, thus currently capital adequacy used as new capital measurement.

Based on study by Abdullah *et al*., (2014) proves that capital ratio is an important aspect on banking sector whereby, higher capital ratio can create more potential loans and take in credit loss in order to boost up their performance. Robin *et al*., (2018) explore on capital adequacy as bank specific variables bring significant relationship on bank performance. This shows well capitalized financial institution lead to earn more profit

and improve their performance. In line with Berger, (1995) a lower capital ratio shows a bank in comparatively risk position as well it may lead to bank run.

But according to Barnor & Odonkor, (2012) they found negative impact on capital adequacy towards bank performance. In the studies explained that minimum capital requirement kept apart separately which have a tendency to absorb loss, this affect the bank performance. In line with Mathuva, (2009) who found minimum capital reserve seen as to generate higher potential income to the banks under higher risk exposure. In Nigeria, study by Aremu, Christopher, & Mudashiru, (2013) also found capital adequacy bring negative relationship towards bank performance on log run as the bank unable to utilize the capital reserve which led to inefficient capital management.

In contrast, study done by Abiola & Olausi, (2014) brings in insignificant results towards bank performance. On study done by Alper & Anbar, (2011) found no significate among capital adequacy and bank performance in turkey.

Briefly, most of study done agree that bank specified factor capital adequacy have impacted on the financial institution's financial performance. Although there was some argument on the outcome whether it affect in positive or negative way, it is still reliable to evaluate capital ratio as bank specified factor into this research.

2.2 CONCLUDING REMARK

In short, this chapter discussed literature review related with the topic of the study. It includes theory like Innovation Diffusion Theory discusses uncertainty reduction behaviour among the potential adapters during the first technological innovation. Technology Acceptance Model which discussed usefulness of technology whether it improves the job performance.

Next, for the past studies includes argumental review on the dependent variables and independent variable. For this study the past studies include review for ROE as dependent variable and technology, macroeconomic and internal factor as independent variables.

CHAPTER 3

METHODOLOGY

3.0 DATA DESCRIPTION AND SAMPLE SIZE

This study is been conduct using quantitative research, by employing secondary data into research. Data is collected for 12 years which are from year 2005 to 2017. The sample of study covers of 8 local commercial banks in Malaysia as stated in Appendix 1. The data been categorized in three part which is technology variables, macroeconomic variables and bank-specific variables. For technology variables the 'Internet Banking Subscribes' had been used as proxy for technology. Data for the technology variables are been obtain from Bank Negara website and annual reports of each individual banks. The annual reports can access from the Bursa Malaysia website or bank's official website. On the macroeconomic variables, the data been extract from World Bank database on the period year 2005 until 2017. For the bank specific variables, some variables comprise ratio measurements, therefore the financial ratio for the related variables calculated by the researcher by referring banks' balance sheet, cash flow, profit & loss statements and other related item in the annual report. Therefore, the sample size in this study is 84 observation.

Table 3.1
List of data collection

Variables	Formula	Sources
Return on The Equity (ROE)	$(Total\ Net\ Income)$ $/\ (Shareholders\ Equity)$	Annual Report
Technology	Internet Banking Subscribes used as proxy for Technology	Annual Report and Bank Negara website
Gross Domestic Product	Annual GDP Growth is calculated: - $GDP = Consumer\ spending(C) + Government\ expenditure(G) + Total\ investment(I) + Total\ net\ exports(X)$	World Bank data
Inflation	Consumer Price Index is calculated: - $CPI = \frac{Cost\ of\ market\ basket_1}{Cost\ of\ market\ basket_0} \times 100$	World Bank data
Bank Size	Bank size is measured by Total Asset of a bank	Annual Report
Credit Risk	$(Total\ Loan\ Provision)\ /\ (Total\ Loan)$	Annual Report
Capital Adequacy	$(Tier\ 1 + Tier\ 2)\ /\ (Risk\ weighted\ asset)$	Annual Report

3.1 RESEARCH FRAMEWORK

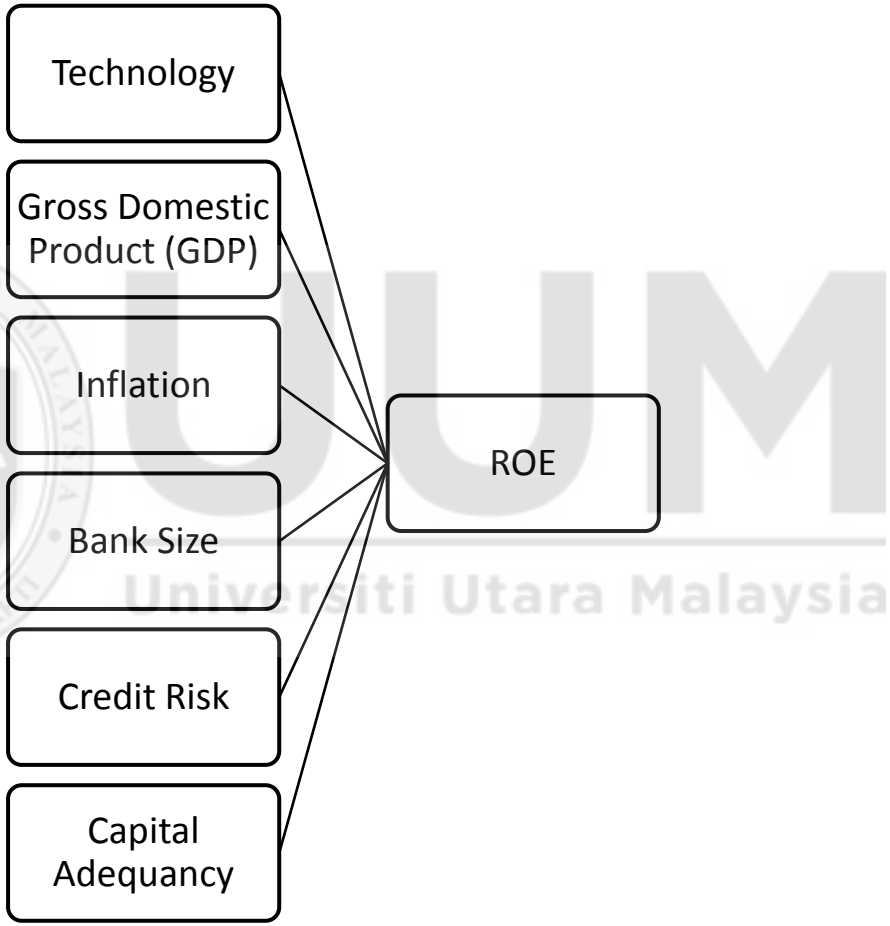

Figure 3.1
Theoretical framework

3.2 OPERATIONAL DEFINITION

Variables	Definition	Past studies
Return on The Equity (ROE)	ROE shows on how the bank profit relative towards its total equity.	Akhisar, Tunay, & Tunay, (2015) Tunay, Tunay, & Akhisar, (2015) Robin, Salim, & Bloch, (2018)
Technology	Technology is application which provide and transact financial product by easy and convenient way.	Akhisar, Tunay, & Tunay, (2015) Tunay, Tunay, & Akhisar, (2015) Chai, Tan, & Goh, (2016) Gutu, (2014) Beccalli, (2007)
Gross Domestic Product	GDP is a measurement of market value in the scope of final goods and services that been produce in the economical time.	Robin, Salim, & Bloch, (2018) Hailegebreal, (2016) Kanwal & Nadeem, (2013)
Bank Size	Bank size is measured by total assets of a bank.	Robin, Salim, & Bloch, (2018)

		Muda, Shaharuddin, & Embaya, (2013)
Credit Risk	Credit risk is a risk when a borrower unable to repay a debt and end up became default loan.	Robin, Salim, & Bloch, (2018) Edirisuriya, Gunasekarage, & Dempsey, (2015) Abdullah, Parvez, & Ayreen, (2014)
Capital adequacy	The bank capital is determined by using capital ratio which indicates the solvency of financial institutions.	Robin, Salim, & Bloch, (2018) Muda, Shaharuddin, & Embaya, (2013)

3.3 VARIABLES AND HYPOTHESIS DEVELOPMENT

3.3.1 Measurement of bank performance

In most of studies ROA and ROE used as indicator widely to determine their banks performance. ROA works on how the bank profit relative towards its total asset. Whereby, ROE shows on how the bank profit relative towards its total equity (Akhisar et al., 2015). In short, cross country studies bring in mix results on bank performance indicator. Some researches like Alexiou & Vogiazas, (2009) believes that ROA can be biased at some point as it doesn't take into account off balance sheet activities. Thus, in this study ROE will be used as an indicator for bank performance.

3.3.2 Technology

Study on the technology factor and the banking performance is an important issue. In banking technology is application which provide and transact financial product by easy and convenient way. It can be seen through internet or mobile banking uses at the same time boost the bank profit. The impact from its outcome may influence the banking sector role and strategy (Webster, 1997). For example, if technology positively correlated towards bank performance, then banks should develop plans to maximise the usage of technology. At the same time, According to Sufian et al., (2016) Malaysia banking segment controls greater part of financial flows and accounts over 70% financial system resources, the results might affect the policy made by the government. Therefore, the hypothesis for technology is: -

H_1: There is a significant relationship between technology and bank performance.

3.3.3 Gross Domestic Product (GDP)

GDP is a measurement of market value in the scope of final goods and services that been produce in the economical time. On the macroeconomic level, GDP used to evaluate total economic activities. GDP indicator also reflects the capacity of a borrower in bank loan or debt servicing. Consequently, higher economic growth may encourage loan repayment and reduce the credit risk, while economic growth towards low it may lower the strength of debt servicing where increase in non-performing loan affect the banking performance negatively by (Robin *et al.*, 2018). Use GDP as a variable expected to positively affect profitability. Hence, the hypothesis for GDP is: -

H_2: There is a significant relationship between GDP and bank performance.

3.3.4 Bank size

Bank size is measured by total assets of a bank. According to Muda *et al.*, (2013) large size bank may reduce costs and thus increase profits due to economies of scale. On the other hand, large banks may not be efficient in reducing operational cost and become less profitable compared to small size banks by (Sufian & Habibullah, 2012). Consequently, the hypothesis for bank size is: -

H_3: There is a significant relationship between bank size and bank performance.

3.3.5 Credit risk

Credit risk is a risk when a borrower unable to repay a debt and end up became default loan. In banking sector, the main income is generated from interest from loan given. According to Miller & Noulas, (1997) non-performing loans may decreases the bank profitability if been overlooked which lead to credit risk. In this event, the hypothesis for credit risk in this study is: -

H_4: There is a significant relationship between credit risk and bank performance.

3.3.6 Capital adequacy

The bank capital is determined by using capital ratio which indicates the solvency of financial institutions. This reflects bank's capability to absorb losses incurred due to poor asset quality as by Robin *et al.*, (2018). Introduction of Basel capital framework changes bank capital structure, now capital adequacy used as new capital measurement by Jones, (2000). According to Berger, (1995) lower capital ratio stated a bank in risk position, thus it may lead to bank run. So, the hypothesis for capital adequacy for this study is: -

H_5: There is a significant relationship between capital adequacy and bank performance.

3.4 SUMMARY OF HYPOTHESIS

H_1: There is a significant relationship between technology and bank performance

H_2: There is a significant relationship between gross domestic product and bank performance

H_3: There is a significant relationship between bank size and bank performance

H_4: There is a significant relationship between credit risk and bank performance

H_5: There is a significant relationship between capital adequacy and bank performance

3.5 METHOD OF ANALYSIS

3.5.1 Descriptive Analysis

Descriptive analysis delivers a summary on the quantitative data sample. Commonly, it generates measurements of tendency like mean, median and mode. Together, it also provides variance or standard deviation and variables lowest and highest value. In this study, value of minimum, maximum, mean and standard deviation are been explained for the data used.

3.5.2 Correlation Analysis

This analysis is used to find the risk factor responds towards independent variables. Normally, the results contribute to the hypothetical scenarios whereby, it provides the relationship between dependent and independent variables. Values of the results near to 1 indicates stronger relationship and vice versa. In this study, person correlation is

generated using SPSS to test the direction and the weight of relationship between independent variables and dependent variables.

3.5.3 Regression Analysis

In order to proceed with regression analysis, the data should be analysis with some assumption to fit the model. The assumption includes assumption like normality, homogeneity, linearity and multicollinearity. All this assumption will be discussed as below: -

3.5.3.1 Normality

In this study the normality tested using skewness and kurtosis value which can be found under descriptive analysis in SPSS. The purpose of this test is to ensure the fitness of data before proceeding to multiple regression analysis. This test is conducted on data to fit a standard normal distribution. Normally, based on Hair, Black, & Anderson, (1998) for normal distribution the skewness range will be between +2 to -2. The result of the data is based on Table 4.2 below.

3.5.3.2 Multicollinearity

Multicollinearity is a situation where independent variables have higher correlation each other. In the best situation, the study would be having higher correlation among independent variable with dependent variables, in chorus with lower correlation among independent variables. It can find through correlation analysis where a condition of having higher correlation (0.80 or more) with another independent variables. Multicollinearity may lead inaccuracy in regression coefficient due to higher standard

error value. In addition, multicollinearity can also be detected through Variance Inflation Factor (VIF) and tolerance level. Based on Gujarati & Porter, (2009) discussed formula for $VIF = \frac{1}{(1- R^2)}$ and $Tolarance = \frac{1}{VIF}$

Based on that, when the value of tolerance is below 0.10 at the same time VIF are above 10 that indicates serious multicollinearity problem. Thus, in this study multicollinearity was test using VIF and tolerance.

3.5.3.3 Linearity

Linearity analysis can be designated in statistical in order to describe connection between variables. Graphical format is the best way of linearity analysis in order to understand well the data. In SPSS it can be done through P-P plot under descriptive dialogue box. P-P plots explained through straight line where by non-linear relationship is enlightened through residual which is unexplained portion of dependent variables. The purpose to test linearity is as an alternative of correlation analysis in examining the linear connection between variables. The correlation analysis might be affected by non-linear factor which not show in linearity analysis.

3.5.3.4 *Homogeneity*

Commonly, homogeneity test is conducted using statistical test which is called Levene's test. Through homogeneity the relationship of independent variables and dependent variables can be explained without limiting the range of independent variables. It is the best way to test the dependent variables in equal level of variance range with independent variables range. In this study SPSS provide scatter plot and Levene's test been used for homoscedasticity.

3.5.4 Multiple regression analysis

Ordinary Least Square (OLS) is known as coefficient model is part of panel regression model for panel data analysis. Based on Siddik, Sun, Kabiraj, Shanmugan, & Yanjuan, (2016) and Binuyo & Aregbeshola, (2014) which employed POLS in their studies related technology and bank performance. Together, for the constant variables some studies by Oluwaseyi Ebenezer, Ahmad Wan Bin Omar, & Kamil, (2017) had used same method to generate their data. This model is appropriate to use, as our bank sample had similar performance and characteristic which fulfil the assumption in OLS model. Besides, OLS model is a proper model for this study in determine the true relationship between the variable chosen and bank performance where different bank slopes does not disturb the relationship between dependent and independent variables. In this study, the regression analysis is conducted using stepwise method by SPSS software.

3.5.5 Econometrics framework

To examine the effect of Technology factor, Macroeconomic Factor and Bank internal factor towards bank performance the Pooled Ordinary Least Squares (POLS) Regression Model is executed as below,

$$Y = \beta_0 + \beta_1\, Technology + \beta_2\, GDP + \beta_3\, Bank\ size\ + \beta_4\, Credit\ Risk + \beta_5\, Bank\ adequacy + e \ldots (i)$$

where,

Y= Bank performance in terms of ROE.

β_1= Technology

β_2= Gross domestic product,

β_3= Bank size

β_4= Credit Risk

β_5= Bank adequacy

3.6 CONCLUDING REMARK

In brief, this chapter describes the research methods used to achieve the objectives. The relationship between independent variables (technology, GDP, bank size, capital adequacy and credit risk) and dependent variables (ROE) explain through theoretical framework. Based on theory and past studies discussed in chapter 2, five hypotheses been developed to ensure the objective of the study are achieved. This study organized through panel data. Most of data obtained from the financial statement of banks and World bank data. All the data process through diagnostic test before proceeded to regression analysis. It is to ensure data used to fit the model. The results will be explained on the chapter 4.

CHAPTER 4

FINDINGS

4.0 DESCRIPTIVE ANALYSIS

Table 4.1
Descriptive Analysis

Variables	Minimum	Maximum	Mean	Std. Deviation
ROE	-10.960	32.450	17.148	6.728
LTECH	14.771	17.054	16.115	.719
LGDP	25.690	26.546	26.246	.273
LSIZE	16.971	20.455	18.824	.915
C.RISK	-.002	.037	.005	.006
CAP	11.050	21.760	15.435	1.726

Table 4.1 are based on 8 commercial banks in Malaysia. It shows that the maximum value of ROE is 32.450 and the lowest value of ROE is -10.960. This finding brings standard deviation value of 6.728. At the same time, the mean value shows 17.148.

For technology variables the mean value shows 16.115. Displays that the higher number of technologies factor is 17.0542 and the lower number of technologies user is 14.771 with standard deviation of 0.719.

In macroeconomic variables, GDP indicates maximum value of 26.546 and. The mean value for GDP is 26.246 and. It also indicates that standard deviation value for GDP is 0.273.

Together, this analysis shows average of capital adequacy 15.435 per bank and average of bank credit risk is 0.005 for per bank. The stand deviation value for both capital adequacy and credit risk is 1.726 and .006 respectively. Bank size is explained with largest value 20.455 and 16.971 of lowest value. The mean value for bank size is 18.824 per bank.

4.1 CORRELATION ANALYSIS

Table 4.2
Correlation Analysis

		ROE	LTECH	LGDP	LSIZE	C.RISK	CAP
ROE	Pearson Correlation	1	.257***	.385***	.296***	-.563***	-.044
	Sig. (2-tailed)		.008	.000	.002	.000	.658
	N	104	104	104	104	104	104
LTECH	Pearson Correlation	.257***	1	.940***	.419***	-.631***	.352***
	Sig. (2-tailed)	.008		.000	.000	.000	.000
	N	104	104	104	104	104	104
LGDP	Pearson Correlation	.385***	.940***	1	.393***	-.646***	.272***
	Sig. (2-tailed)	.000	.000		.000	.000	.005
	N	104	104	104	104	104	104
LSIZE	Pearson Correlation	.296***	.419***	.393***	1	-.247**	.188
	Sig. (2-tailed)	.002	.000	.000		.011	.056
	N	104	104	104	104	104	104
C.RISK	Pearson Correlation	-.563***	-.631***	-.646***	-.247**	1	-.280***
	Sig. (2-tailed)	.000	.000	.000	.011		.004
	N	104	104	104	104	104	104
CAP	Pearson Correlation	-.044	.352***	.272***	.188	-.280***	1
	Sig. (2-tailed)	.658	.000	.005	.056	.004	
	N	104	104	104	104	104	104

***. Correlation is significant at the 0.01 level (2-tailed)
**. Correlation is significant at the 0.05 level (2-tailed)
*. Correlation is significant at the 0.10 level (2-tailed)

Based on Table 4.2 shows the correlation analysis between independent variables and dependent variables. Result indicates that technology, GDP, bank size and credit risk

have correlation with ROE. The technology, GDP, bank size is correlated .0257, .385 and .296 respectively. The highest correlation found on credit risk variable with -.563 correlation. In the meantime, this analysis shows capital adequacy doesn't correlate with ROE.

4.2 DIAGNOSTIC TESTING

Diagnostic testing consists of normality, linearity, multicollinearity and homogeneity test. In this study assumption is used for data comparison in order to fit the model.

4.2.1 Normality

Table 4.3
Normality test

Variables	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
ROE	-.709	.237	1.932	.469
LTECH	.291	.237	-.941	.469
LGDP	-.768	.237	-.764	.469
LSIZE	-.313	.237	-.922	.469
C.RISK	-.771	.237	-1.430	.469
CAP	.383	.237	1.353	.469

Table 4.3 illustrate skewness and kurtosis analysis which reflect the normality test. This test will be executed on all variables which is ROE, technology, GDP, bank size, credit risk and capital adequacy. Based on Hair, Black, Babin, & Anderson, (1998) discussed that skewness and kurtosis indicator should between -2 to +2 to show normal data. Based on table shows that highest value of kurtosis is 1.932 for ROE which is still around +2. In this study all the variables qualify and reach the objective for further analysis.

4.2.2 Multicollinearity

This is an important test as this study involves more than two independent variables. There are higher chances of for multicollinearity to occur in regression model when it involves more than two independent variables. Based on Hair et al., (2014) the Variance Inflation Factor (VIF) should be below 10, in order to indicate lower multicollinearity problem. Multicollinearity problem will affect overall regression model result as it will cause rise in variance. Also, this will cause wrong data and model result interpretation.

Table 4.4
Collinearity analysis

Variables	Tolerance	VIF
C.RISK	.882	1.133
TECH	.505	1.979
LGDP	.521	1.921
LSIZE	.924	1.083
CAP	.907	1.103

Based on Table 4.4, test assumes that credit risk, technology, GDP, bank size and capital adequacy are correlated among independent variable but in small range. Hence this study is conducted by using all variables except inflation variables which bring multicollinearity problem.

4.2.3 Linearity

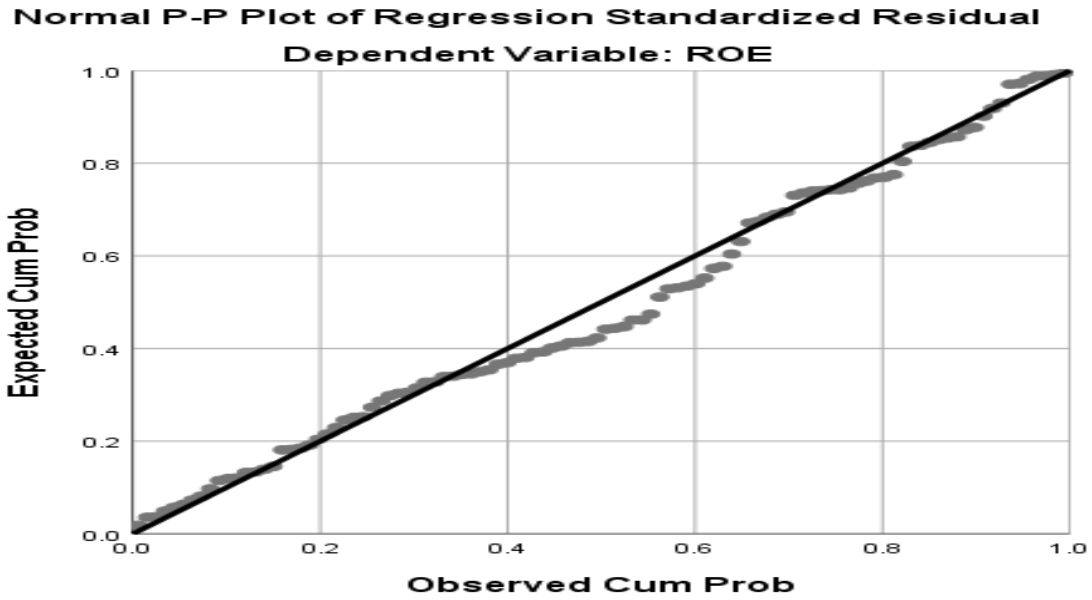

Figure 4.1
Linearity graph

This test can be employed through P-P Plot of Standardized Residual to show linearity analysis. The objective of this test is to find the relationship among independent variables and dependent variables. Through Figure 4.1 directs the relationships through straight line, whereby the slope and intercept explain variables relationship. This test finds that the data in this study is has no threated on the regression model. Thus, all the variable is eligible for further analysis in order to reach objective of the study.

4.2.4 Homogeneity

Table 4.5
Homogeneity analysis

Levene Statistic	df1	df2	Sig.
1.085	7	96	.381

Based on Table 4.5 shows Leven test for homogeneity is not significant. The value 0.381 is above 0.05 thus the population variance is to be equal and the data is not violated. The table also shows the value of Leven test is 1.085.

4.3 REGRESSION ANALYSIS RESULTS

4.3.1 Model summary

The model summary able to provide detail about regression model total variation in dependent variables. In this study method of regression used is stepwise, so it is important to explain the summary for this study.

Table 4.6
Model summary

R Square	Adjusted R Square	Std. Error of the Estimate
.397	.379	5.3020

Table 4.6 shows R-square 0.397 where it indicates the variation level in dependent variable which can be explained through independent variables. The value of R-square 39.7% are consider acceptable for this study. Furthermore, the adjusted R-square shows 37.9% independent variables which are significate describes dependent variables.

4.3.2 ANOVA analysis

Table 4.7
ANOVA analysis

	Sum of Squares	df	Mean Square	F	Sig.
Regression	1851.412	3	617.137	21.953	.000
Residual	2811.166	100	28.112		
Total	4662.578	103			

ANOVA analysis displays the variables are significantly at p <0.01 level with 21.953 of F-value. This bring that variable that been used in this study are statistically affect to study bank performance.

4.3.3 Coefficient analysis and t-statistic

Table 4.8
Coefficient analysis and t-statistic

Model	B	Std.error	t	P-value
(Constant)	31.006	16.479	.677	.500
C.RISK	-.582	96.685	-7.046***	.000
LTECH	-.212	1.008	-1.971*	.051
LGDP	-.005	5.352	-.050	.960
LSIZE	.198	.594	2.447**	.016
CAP	-.244	.318	-2.993***	.003
	a. Dependent Variable: ROE			

Note: * denotes significate at 10%, ** denotes significate at 5% and *** denotes significate at 1%.

$$Y_{it} = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \beta_4 x_4 + \beta_5 x_5 + \mu_{it}$$

$$Y_{it} = \beta_0 + \beta_1 Log\ Technology + \beta_2 Log\ GDP + \beta_3 C.Risk + \beta_4 Log\ B.Size + \beta_5 C.Adequacy + \mu_{it}$$

$$Y_{it} = \beta_0 - 0.212\ Log\ Technology - 0.005\ Log\ GDP - 0.582\ C.Risk + 0.198\ Log\ B.Size - 0.244\ C.Adequacy$$

$$t\ stat = (0.677)(-1.971)(-0.050)(-7.046)(2.447)(-2.993)$$

$$Prob. = (0.500)(0.051)(0.960)(0.000)(0.016)(0.003)$$

$$n = 104$$

$$R^2 = 0.397$$

$$Adjusted\ R^2 = 0.379$$

For technology variables indicates -0.212 (t-statistics= -1.971) of standardized coefficient. These findings explain that technology is negatively related towards ROE by -0.212%. This shows increase in technology factor in bank will reduce bank performance. In other word 1% increase in technology factor will reduce 0.00212% of ROE. Plus, based on the significant level 10% the hypothesis that stated there is a

significant relationship between technology and bank performance is accepted. In line with Gutu, (2014), who finds that technology bring negative impact toward banking performance. It would be because of lack of technology infrastructure which lead to negative relation.

Standardized coefficient for credit risk is estimated -0.582 (t-statistic= -7.046). This illustrate that credit risk is negatively related toward ROE by 0.582 units. This outcome shows 1 unit increase in credit risk will decrease 0.582 units in ROE. Based on the significant level 1% the hypothesis that stated there is a significant relationship between credit risk and bank performance is accepted. According to Miller & Noulas, (1997) discussed that non-performing loan will turn into credit risk if overlooked and this situation will affect the bank performance.

Furthermore, capital adequacy brings negatively significate towards ROE. Based on table shows that standardized coefficient for capital adequacy is estimated -0.244 (t-statistic= -2.993) with 0.01 significate level. In other word, 1 unit increase in capital adequacy will reduce 0.244 units in ROE. Thus, the results accepted the hypothesis at 1% significate level stated there is a significant relationship between capital adequacy and bank performance.

On the other hand, bank size is positively and significantly related towards ROE with 0.198 (t-statistic= 2.447) which significate at 0.05. The study shows 1% increase in bank size will rise the ROE 0.00198%. Based on Abdullah et al., (2014) proves that bank size can give positively impact toward bank performance. Through the results, the hypothesis states there is a significant relationship between bank size and bank performance is accepted at 5% significate level.

However, there were no significate relationship found among GDP variables towards ROE. This finding is in line with Sufian et al., (2016) and Alper & Anbar, (2011) where they find that GDP really doesn't reflect on bank performance. However, the significate level does not support the result which exceeded 1%, 5%, and 10% of significate level. This is due higher competition environment creates new idea and innovation forces the bank to work independent.

4.4 CONCLUDING REMARK

Briefly, this chapter discussed the findings based on analysis performed. Firstly, the discussion on descriptive analysis and correlation analysis. Followed by diagnostic testing used for data comparison in order to fit the model. Diagnostic testing consists of normality, linearity, multicollinearity and homogeneity test. In order to test the hypothesis, the regression analysis was conducted for this study. The finding shows technology, bank size, capital adequacy and credit risk have a significate relationship towards bank performance in Malaysia. But there no significate found among GDP towards Malaysia bank performance.

CHAPTER 5

CONCLUSION AND CONTRIBUTION OF THE STUDY

5.1 OBJECTIVE 1

In this study it had achieved the first objective of study where to investigate bank internal factor relationship on Malaysia commercial bank performance. Based on this study, all of three variables shows significate correlation towards bank performance. Bank size shows positive correlation, as by Abdullah *et al.*, (2014) who finds bank size bring positive impact towards bank performance. This explains that larger bank size tends to increase bank performance. In Malaysia larger bank seems to be more economical and convenience for customer.

Additionally, the capital adequacy found to be negatively correlated. In line with Mathuva, (2009), Barnor & Odonkor, (2012) and Aremu *et al.*, (2013) who find that capital adequacy bring negative relationship on bank performance. Although, lower capital reserve amount shows riskier position, but lower capital reserves create higher chances to gain more return under risk exposure.

Moreover, credit risk play an important role in banking system. In this study the result shows that it is negatively correlated. Aline with, Abdullah *et al.*, (2014) and Edirisuriya *et al.*, (2015) finds that credit risk causes reduces the bank performance. According to Miller & Noulas, (1997) higher non-performing loan led to credit risk if been overlooked. In Malaysia, most of loan are been approved by 5C assessment in order reduce loan default.

5.2 OBJECTIVE 2

Second objective of this study is to analyse the connection of macroeconomic variables towards Malaysia commercial banking performance. Through this study there were no significate found on the macroeconomic variables. In line, with Alper & Anbar, (2011) macroeconomic factor like GDP doesn't reflect on bank performance. It may due to the bank's high independency level after financial crisis which build the bank strength up.

5.3 OBJECTIVE 3

Sufian *et al.*, (2016) had expressed that Malaysia banking sector plays an important role. Thus, adaptation of technology on current banking system is an issue to study which it might affect the banking sector. Therefore, the study found that banking technology are significantly correlated. This had reached the third study objective to examine the relationship of technology factor towards bank performance. Thru, its results indicate that technology corelated negatively. It clear that, higher level of banking technology might lower down the banking performance in Malaysia. This result has been supported by Gutu, (2014) and Hossein, (2013). In Malaysia, although people are welcoming technology, but the banks are facing hike in cost which affect the performance. Currently, the banks still on the stage of developing competitive technology, where most of capital been used for research and development. At this stage the shows rise in the expenditure, but the outcome of better performance can be seen in future.

5.4 CONTRIBUTION OF STUDY

5.4.1 Academic

In academics, this study would provide clear picture of Malaysia banking sector environment. Furthermore, the education institution can contribution by organizing event like dialogues, conferences and invention fair to boost banking innovation in efficient cost. Plus, it will attract and encourage more students to innovate more technology instrument for banking sector in future.

5.4.2 Policy Maker

On the other hand, consistence with Kajian Rancangan Malaysia Ke-11 (RMK-11) to achieve vision 2020, this study had engaged with the policy maker to focus and contribute in banking innovation. The policy maker should look into in untighten the law for financial institution to create a platform for further banking technologies development. At this time, tighten law limited the capacity of financial development which affect the bank performance. Plus, the government should provide some incentive for Malaysia commercial banks in terms to expanding banking innovation alliance with Bank Negara to ensure the sustainable performance.

5.4.3 Industry player

This study contributes the effect of technology toward Malaysia commercial banking performance. Through this study it provides most current findings and more knowledge of technologies on banking sector. Thus, this finding believes to provide the strategic plan for industry player including Malaysia banking sector in order to improve their performance in step with the banking technology advancement. The findings picturised

the gap of ROE as bank performance on adoption of banking technologies in Malaysia banks. Currently, Malaysia banks been exposure to new risk like political risk and interest rate risk which due to globalization. It can be overcome with innovation of new technology in order to mitigate the risk, where with develop of operational efficiency in order reduce the operation cost which will boost the bank performance in future.

5.5 LIMITATION OF STUDY

There were some difficulties during this study. On the data collection process there were limited data on internal variables for some banks. This cause some factor to be compute manually. Plus, availability data for technology variable for the year 2000 are unavailable however due to limited data availability, this study is conducted using 12 years data which is from the year 2005 until 2017. Thus, this limited the time frame of this study, might cause bias result compared longer time frame of study.

Besides, limited time to complete this research is the main factor that this study conducts focused only Malaysia domestic bank without foreign bank. As discussed before larger bank sample might give better result.

5.6 RECOMMENDATION AND FUTURE RESEARCH

Based on finding found that banking innovation and technology bring negative impact towards bank performance. However, Malaysia government are committed to achieve Vision 2020 which includes digitalization and 4.0 industry. It would be great if the Malaysia commercial banks involve in technology advancement in order to compete along develop innovative product into banking industry. Innovation and bankers who experts in is future needs to boost the industry efficiency and performance. At the same

time, it will increase the ability of local commercial banks to face competition with foreign banks as some foreign banks more advanced product where Malaysia commercial bank need to adapt.

Besides that, the central banks need to play an important role in ensure the strengths of local banks in facing digitalization. The Malaysia central banks should come up with some incentives for Malaysia banks which allows bank innovates new banking technology into the industry without affecting their operating cost. Alliance with some local universities will make this possible as most of the youngster able to generate innovative ideas and knowledge.

For future studies suggestion, the research may include more bank technologies variables in order to study future development of banking sector. Moreover, future study recommended to include all domestic and foreign bank as sample of study in order to study clear picture of Malaysia banking sector environment.

The data collection method can be improvised by using qualitative and quantitative method. The future studies can conduct interview or discussion with bank IT managers to gain more info on adoption of technology in banking sector and its challenges.

5.7 CONCLUDING REMARK

In nutshell, the study concludes the technology brings negative impact towards bank performance in Malaysia. Furthermore, believes that bank internal factor contributes significate impact towards bank performance. Thus, this finding believes to provide the strategic plan for industry player including Malaysia banking sector in order to improve their performance in step with the banking technology advancement. Besides in this chapter also includes recommendation where, the Malaysia central banks should come

up with some incentives for Malaysia banks which allows bank innovates new banking technology into the industry without affecting their operating cost.

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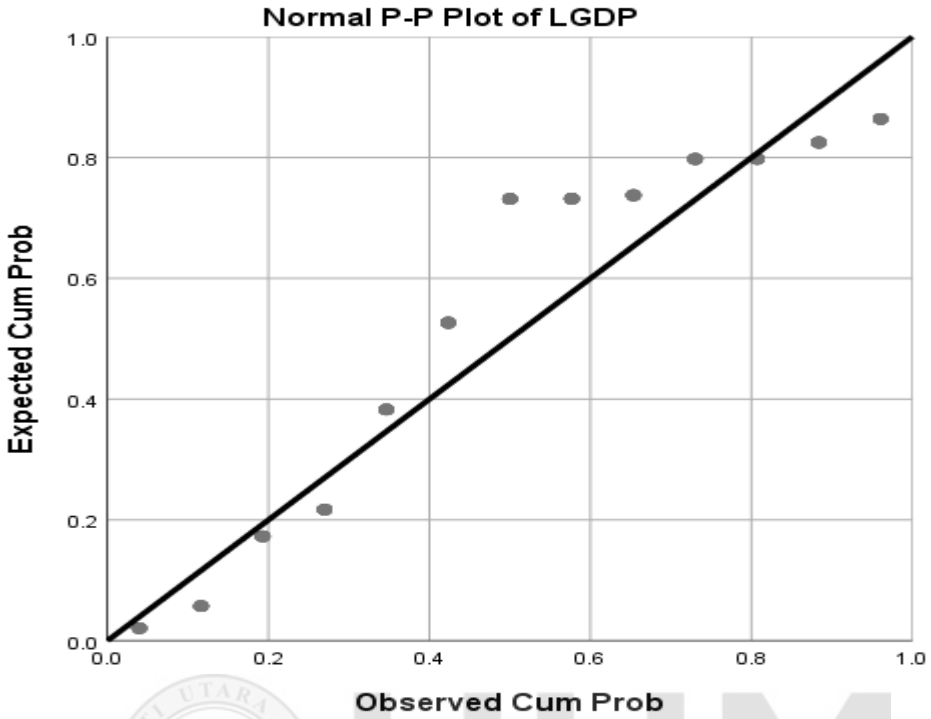
APPENDIX

Appendix 1
List of commercial banks in Malaysia

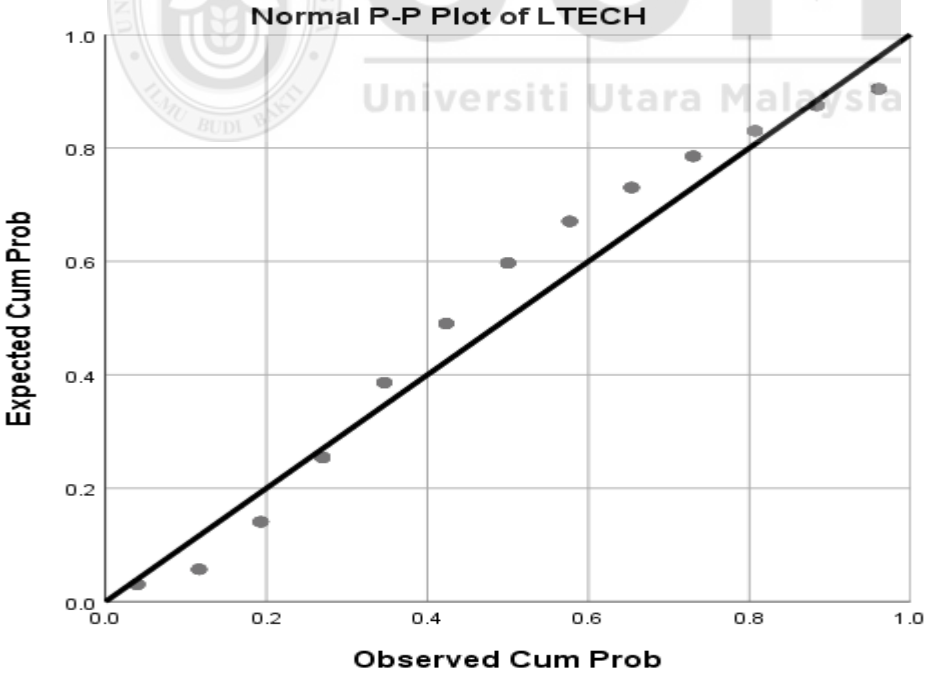
No.	Name
1.	Affin Bank Berhad
2.	Alliance Bank Malaysia Berhad
3.	AmBank (M) Berhad
4.	CIMB Bank Berhad
5.	Hong Leong Bank Berhad
6.	Malayan Banking Berhad
7.	Public Bank Berhad
8.	RHB Bank Berhad

Source: Bank Negara Malaysia, 2018

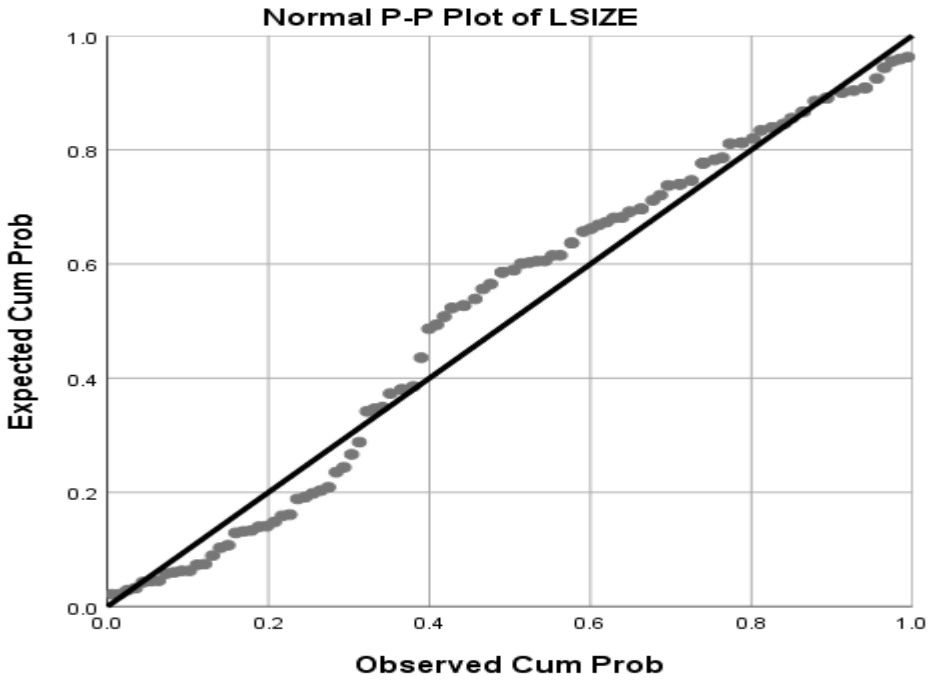
Appendix 2



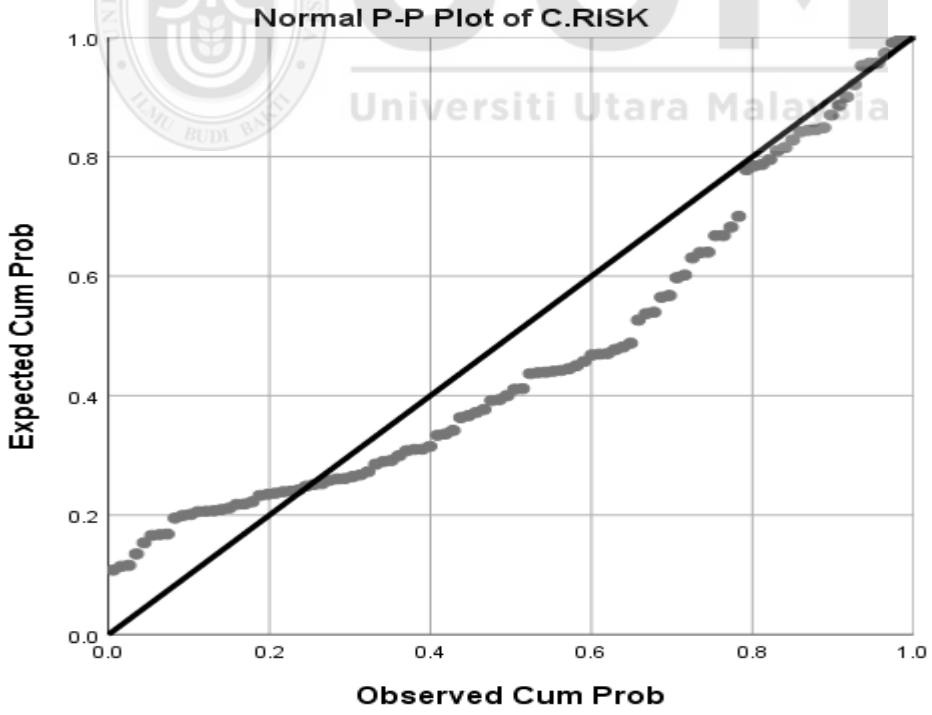
Appendix 3



Appendix 4



Appendix 5



Appendix 6